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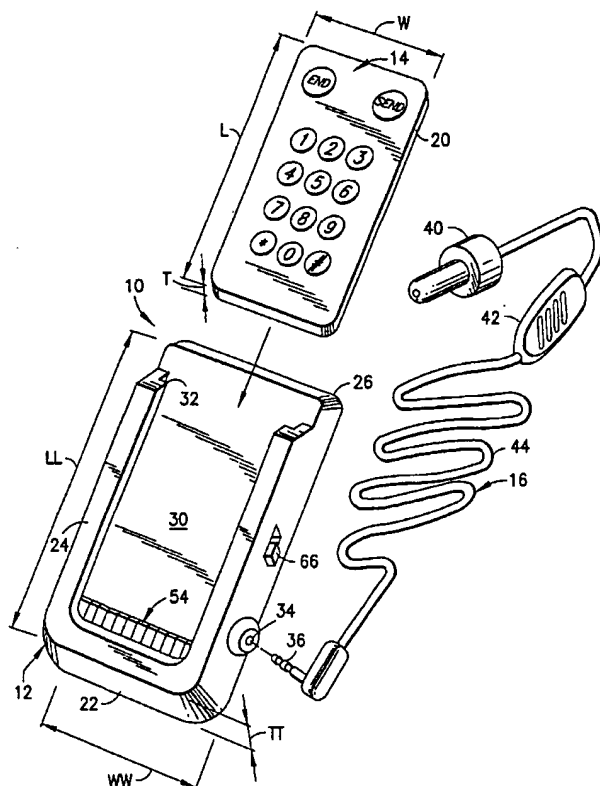
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(54) Title: COMPACT WIRELESS TELEPHONE WITH ENABLING MODULE



(57) Abstract: A compact modular wireless telephone includes a base unit (12), a headset (16) selectively connected to and disconnected from the base unit, and a separate card (14) for placement in the base unit to enable telephonic communication. The card includes an identifier for providing a signal identifying a dedicated service account, an interfacer for interfacing the telephone with a service provider for authorization of a telephonic communication, and a selector for placing an authorized telephonic communication, upon interfacing the telephone with the service provider and gaining authorization for the telephonic communication.

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## COMPACT WIRELESS TELEPHONE WITH ENABLING MODULE

The present invention relates generally to telephonic communications and pertains, more specifically, to a wireless telephone constructed in a compact modular arrangement and having an enabling module allowing the  
5 convenient purchase and use of predetermined amounts of airtime.

The construction of highly compact and economical wireless telephones is described in detail in United States patent numbers 5,875,393 and 5,965,848, granted to Altschul  
10 et al., the substance of which patents is incorporated herein by reference thereto. The present invention provides wireless telephones which are even more compact, and which are constructed for added versatility, convenience and safety in use, as well as for increased  
15 economy of manufacture. As such, the present invention provides several objects and advantages, some of which are summarized as follows: Provides a modular arrangement which allows the use of relatively less expensive modules in a wireless telephone suitable for more widespread use  
20 and acceptance; enables greater convenience in carrying about and using wireless telephones; allows greater convenience in purchasing and using predetermined amounts of airtime; provides a simplified wireless telephone having both call-out and call-in capabilities; reduces  
25 potential hazards associated with electromagnetic radiation emanating from wireless telephones; allows greater convenience in providing power to a wireless telephone; provides greater versatility in the design and function of wireless telephones; enables the economical manufacture  
30 and distribution of relatively low-cost, reliable wireless telephones, thereby opening up new and larger markets for wireless telephones.

The above objects and advantages, as well as further objects and advantages, are attained by the present invention which may be described briefly as a compact modular wireless telephone for telephonic communications,

5 the wireless telephone comprising: an operator module including wireless telephonic operating circuitry, operator electrical connector elements connected to the wireless telephonic operating circuitry, and a power source for supplying power to the wireless telephonic operating

10 circuitry; an enabling module for being supplied separate from the operator module, the enabling module including a body member having limited dimensions, including a limited length, a limited width and a limited thickness, an identifier in the body member for identifying a service

15 account dedicated to the enabling module, an interfacier in the body member, a selector integral with the body member, and enabling electrical connector elements connected to the identifier, the interfacier and the selector, the enabling electrical connector elements being complementary to

20 corresponding operator electrical connector elements; an antenna; an earphone assembly; a microphone assembly; electrical connections for connecting the antenna, the earphone assembly and the microphone assembly with the wireless telephonic operation circuitry; and an

25 interconnect for selectively connecting the enabling electrical connector elements with the operating electrical connector elements such that upon connecting the enabling electrical connector elements with the operating electrical connector elements, signals from the interfacier, the

30 identifier, and the selector are transmitted by the wireless telephonic operating circuitry to interface the wireless telephone with a service provider, to identify the dedicated service account to the service provider for authorization of a telephonic communication, and to

35 establish an authorized telephonic communication.

The invention will be understood more fully, while still further objects and advantages will become apparent, in the following detailed description of preferred embodiments of the invention illustrated in the accompanying drawing, in which:

FIG. 1 is an exploded pictorial perspective view showing a compact modular wireless telephone constructed in accordance with the present invention;

FIG. 2 is a front elevational view of components of the telephone;

FIG. 3 is a rear elevational view of components of the telephone;

FIG. 4 is a schematic diagram of an operating module of the telephone;

FIG. 5 is a schematic diagram of an enabling module of the telephone; and

FIG. 6 is a diagrammatic illustration of a wireless telephonic communications system utilizing a telephone of the present invention.

Referring now to the drawing, and especially to FIG. 1 thereof, a compact modular wireless telephone constructed in accordance with the present invention is shown at 10 and is seen to include an operator module in the form of a base unit 12, an enabling module in the form of card 14, and an audio module in the form of a headset 16. Card 14 includes a body member 20 having very limited dimensions, including a limited length L, a limited width W and a limited thickness T. Typically, card 14 is about the size of currently available credit cards, so that length L is just over three inches, width W is about two inches, and thickness T is a fraction of an inch. These compact dimensions are attained by a construction made available through the technology described in aforesaid United States patent no. 5,965,848, the disclosure of which patent is incorporated herein by reference thereto. Base unit 12

includes a housing 22 which also is provided with limited dimensions, the dimensions of the housing 22 being somewhat greater than the dimensions of body member 20, but still very compact. Thus, for example, housing 22 includes a  
5 length LL of about three and three-quarter inches, a width WW of about two and one-half inches, and a thickness TT of about one-half inch, the thickness TT extending between a front face 24 and a back face 26.

An interconnect enables the selective connection of  
10 card 14 with base unit 12 and includes a receptacle 30 having a card slot 32 at the front face 24 of the housing 22, the card slot 32 being complementary to at least a portion of the body member 20 of the card 14 for receiving at least the portion of the card 14 within the housing 22.  
15 An electrical connection includes a jack 34 in the housing 22 and a plug 36 in the headset 16 for enabling connection of the headset 16 to the base unit 12. Headset 16 includes an earphone assembly shown as an earphone 40 and a microphone assembly shown as a microphone 42, both  
20 connected to plug 36 by an elongate cable 44 having appropriate earphone and microphone electrical conductors for effecting the necessary connections so that the earphone 40 and the microphone 42, when connected to the base unit 12, are remote from the base unit 12.

25 Turning now to FIGS. 2 through 5, as well as to FIG. 1, base unit 12 includes wireless telephonic operating circuitry 50 housed within housing 22 and a plurality of operator electrical connector elements in the form of operating contacts illustrated as electrical contacts 52 of  
30 an electrical connector 54 located within the housing 22, juxtaposed with the receptacle 30, and electrically connected to the telephonic operating circuitry 50. An antenna 56 is located in housing 22 and is connected to the telephonic operating circuitry 50. A power source is  
35 provided in the form of a battery pack 60 placed within a

battery compartment 62 in the housing 22, accessible through a battery access door 64 at the back face 26 of the housing 22, and a power switch 66 selectively controls the supply of power to the telephonic operating circuitry 50.

- 5 For convenience, base unit 12 is provided with a carrying arrangement, shown in the form of a belt clip 68 at the back face 26 of the housing 22.

Card 14 includes a selector in the form of a keypad 80 integrated with the body member 20 of the card 14 in the  
10 manner disclosed in the aforesaid patent no. 5,965,848. Keypad 80 includes number and symbol keys 82, as well as a "SEND" key 84 and an "END" key 86, all located at obverse face 88 of the body member 20. Enabling electrical connector elements are provided in the form of enabling  
15 contacts shown as electrical contacts 90 of an electrical connector 92 placed at reverse face 94 of body member 20. Card 14 further includes a microprocessor 100 within body member 20, and an identifier 110 and an interfacier 112 are placed within the card body 20 and are connected to the  
20 microprocessor 100. The keypad 80 is electrically connected to electrical contacts 90K of the electrical connector 92, and the microprocessor 100 is electrically connected to electrical contacts 90M of the electrical connector 92.

- 25 In the preferred embodiment, identifier 110 includes an identifier memory 120 programmed with a service account identification corresponding to a service account dedicated to card 14, the service account identification being in the form of an electronic serial number (ESN). The interfacier  
30 112 preferably includes an interfacier memory 122 programmed with a dial code representing an interfacing telephone number, the telephone number preferably being a toll-free number for calling into a service provider.

In order to use telephone 10, a user will purchase a  
35 base unit 12 and a card 14. The card 14 is programmed with

an ESN and a toll-free number leading to a service provider who maintains the service account identified by the ESN. The service account dedicated to card 14 is provided with a predetermined amount of airtime, as reflected in the purchase price of card 14. As seen in FIG. 6, card 14 is placed within base unit 12, effecting electrical connections between the electrical connectors 92 and 54. With the power switch 66 actuated to supply power, the toll-free number is dialed, in response to signals from the interfacier 112, and communication is established between the telephone 10 and the service provider 130. Signals from the identifier 110 are transmitted to the service provider 130 for verification of the authenticity of the dedicated service account and to confirm that the service account has airtime available for use. A confirmation signal then is transmitted from the service provider 130 to the telephone 10, enabling the user to initiate a telephonic communication, utilizing the keypad 80 to select a called number. The ensuing telephonic communication, having been authorized by the service provider 130, then is connected and routed by the service provider 130 to the recipient of the communication, either through land lines or through wireless means. The airtime consumed by telephonic communications is monitored by the service provider 130 and, upon the consumption of all of the airtime available in the service account dedicated to card 14, service is discontinued. The user then can discard card 14 and can purchase another card 14, for a purchase price determined by the amount of airtime made available in the service account dedicated to the new card 14. Alternately, the user can instruct the service provider 130 to replenish the service account with additional airtime, for an additional fee.

The arrangement of telephone 10 is available for functioning in a call-out mode only, or for the reception



of incoming calls as well as for making outgoing calls. A construction which allows call-out only is somewhat less expensive to manufacture than a construction which enables the reception of incoming calls as well as the transmission  
5 of outgoing calls; however, a universal construction enabling both modes of operation is practical from a manufacturing standpoint, with the ability to operate in one or the other of the modes being controlled by the service provider, in response to information obtained by  
10 the service provider pertaining to the dedicated service account identified by a particular card 14.

The present telephone 10 provides a very compact and practical arrangement for making available wireless telephonic communication at a very reasonable cost to a  
15 user. Once a user is furnished with a base unit 12, all that is necessary to obtain and use a predetermined amount of airtime is the purchase of a card 14. There is no need to subscribe to a wireless service, there are no corresponding start-up fees, and there is no purchase of a  
20 relatively expensive telephone. Use of telephone 10 is renewable each time the airtime authorized by a card 14 is exhausted, simply by purchasing a new card 14, or by replenishing the airtime in the dedicated service account.

It will be seen that the present invention attains all  
25 of the objects and advantages summarized above, namely: Provides a modular arrangement which allows the use of relatively less expensive modules in a wireless telephone suitable for more widespread use and acceptance; enables greater convenience in carrying about and using wireless  
30 telephones; allows greater convenience in purchasing and using predetermined amounts of airtime; provides a simplified wireless telephone having both call-out and call-in capabilities; reduces potential hazards associated with electromagnetic radiation emanating from wireless  
35 telephones; allows greater convenience in providing power

to a wireless telephone; provides greater versatility in the design and function of wireless telephones; enables the economical manufacture and distribution of relatively low-cost, reliable wireless telephones, thereby opening up  
5 new and larger markets for wireless telephones.

It is to be understood that the above detailed description of preferred embodiments of the invention is provided by way of example only. Various details of design and construction may be modified without departing from the  
10 true spirit and scope of the invention, as set forth in the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A compact modular wireless telephone for  
5 telephonic communications, the wireless telephone comprising:

an operator module including wireless telephonic operating circuitry, operator electrical connector elements connected to the wireless telephonic operating circuitry,  
10 and a power source for supplying power to the wireless telephonic operating circuitry;

an enabling module for being supplied separate from the operator module, the enabling module including a body member having limited dimensions, including a limited  
15 length, a limited width and a limited thickness, an identifier in the body member for identifying a service account dedicated to the enabling module, an interfacier in the body member, a selector integral with the body member, and enabling electrical connector elements connected to the  
20 identifier, the interfacier and the selector, the enabling electrical connector elements being complementary to corresponding operator electrical connector elements;

an antenna;

an earphone assembly;

25 a microphone assembly;

electrical connections for connecting the antenna, the earphone assembly and the microphone assembly with the wireless telephonic operation circuitry; and

an interconnect for selectively connecting the  
30 enabling electrical connector elements with the operating electrical connector elements such that upon connecting the enabling electrical connector elements with the operating electrical connector elements, signals from the interfacier, the identifier, and the selector are transmitted by the  
35 wireless telephonic operating circuitry to interface the

wireless telephone with a service provider, to identify the dedicated service account to the service provider for authorization of a telephonic communication, and to establish an authorized telephonic communication.

5

2. The invention of claim 1 wherein:

the interconnect includes a receptacle in the operator module, the receptacle being complementary to at least a portion of the body member of the enabling module for  
10 reception of at least the portion of the body member within the receptacle;

the operating electrical connector elements include operating contacts in the receptacle; and

the enabling electrical connector elements include  
15 enabling contacts on the body member for connecting the enabling contacts with the operating contacts upon reception of at least the portion of the body member within the receptacle.

20 3. The invention of claim 1 wherein the electrical connections include an earphone connection at the operator module, and the earphone assembly is remote from the operator module and the enabling module and includes an earphone and elongate earphone electrical conductors for  
25 connecting the earphone to the operator module at the earphone connection.

4. The invention of claim 1 wherein the electrical connections include a microphone connection at the  
30 operating module, and the microphone assembly is remote from the operator module and the enabling module and includes a microphone and elongate microphone electrical conductors for connecting the microphone to the operator module at the microphone connection.

35

5. The invention of claim 1 wherein the antenna is located at the operator module.

6. The invention of claim 1 wherein the enabling module includes a microprocessor in the body member, and the interfacier is connected with the microprocessor and includes an interfacier memory programmed with an interfacing telephone number.

7. The invention of claim 1 wherein the enabling module includes a microprocessor in the body member, and the identifier is connected with the microprocessor and includes an identifier memory programmed with a service account identification corresponding to the dedicated service account.

8. The invention of claim 7 wherein the interfacier is connected with the microprocessor and includes an interfacier memory programmed with an interfacing telephone number.

9. The invention of claim 1 wherein the selector includes a keypad, the enabling electrical connector elements include selector electrical connector elements connected to the keypad, and the operator electrical connector elements include complementary selector electrical connector elements for connecting the keypad to the wireless telephonic operating circuitry upon connecting the enabling module with the operating module.

10. The invention of claim 9 wherein the interconnect includes a receptacle in the operator module, the receptacle being complementary to at least a portion of the body member of the enabling module for reception of at least the portion of the body member within the receptacle;

the operating electrical connector elements include operating contacts in the receptacle; and

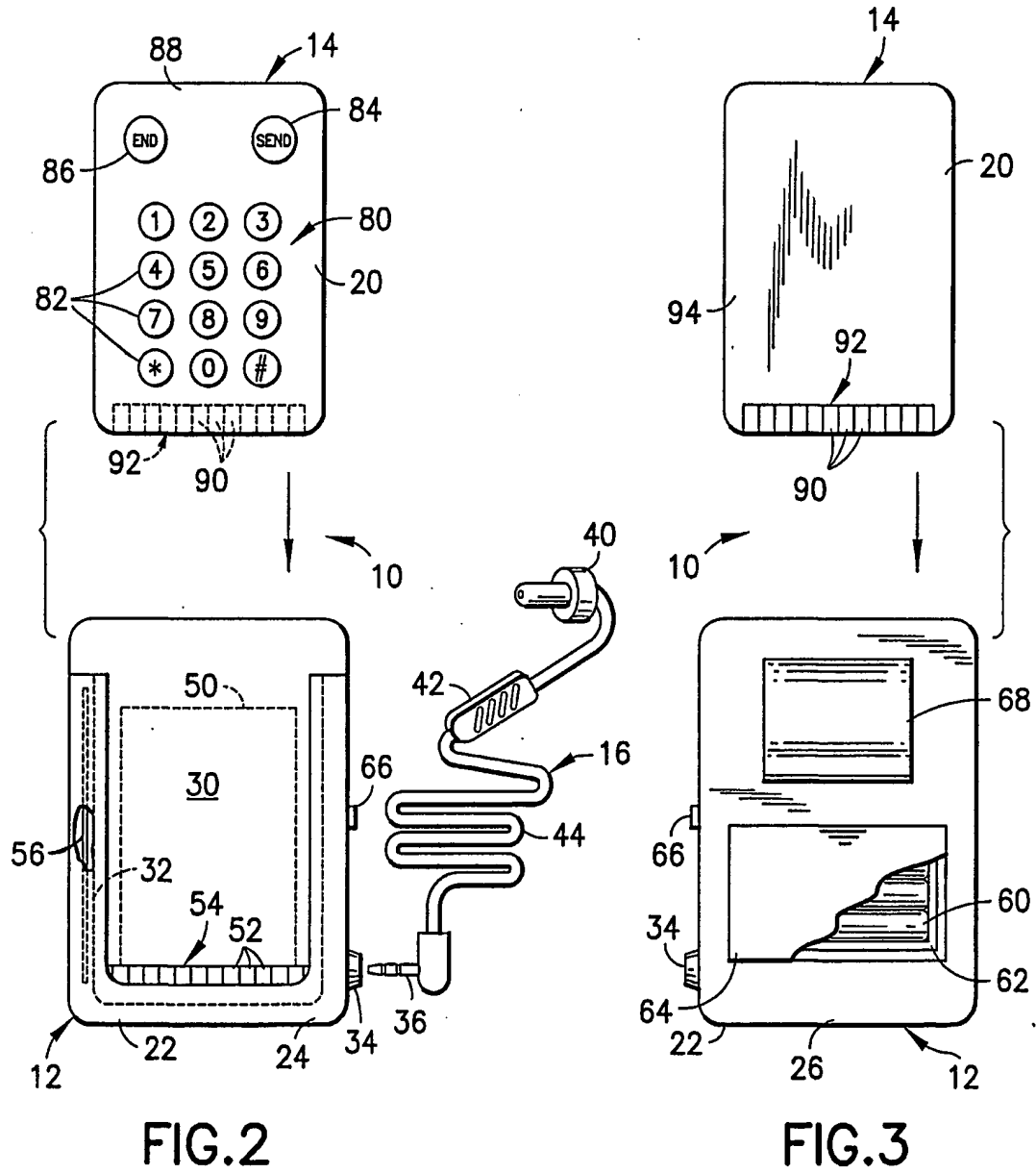
the enabling electrical connector elements include enabling contacts on the body member for connecting the  
5 enabling contacts with the operating contacts upon reception of at least the portion of the body member within the receptacle.

11. The invention of claim 10 wherein the wireless  
10 telephonic operating circuitry includes telephonic circuitry for sending outgoing telephonic communications, and the dedicated service account is provided with a predetermined amount of airtime such that upon identifying the dedicated service account, the service provider enables  
15 outgoing telephonic communications for the predetermined amount of airtime available in the dedicated service account.

12. The invention of claim 11 wherein the wireless  
20 telephonic operating circuitry includes telephonic circuitry for receiving incoming telephonic communications, and the dedicated service account is provided with a predetermined amount of airtime such that upon identifying the dedicated service account, the service provider enables  
25 incoming telephonic communications for the predetermined amount of airtime available in the dedicated service account.



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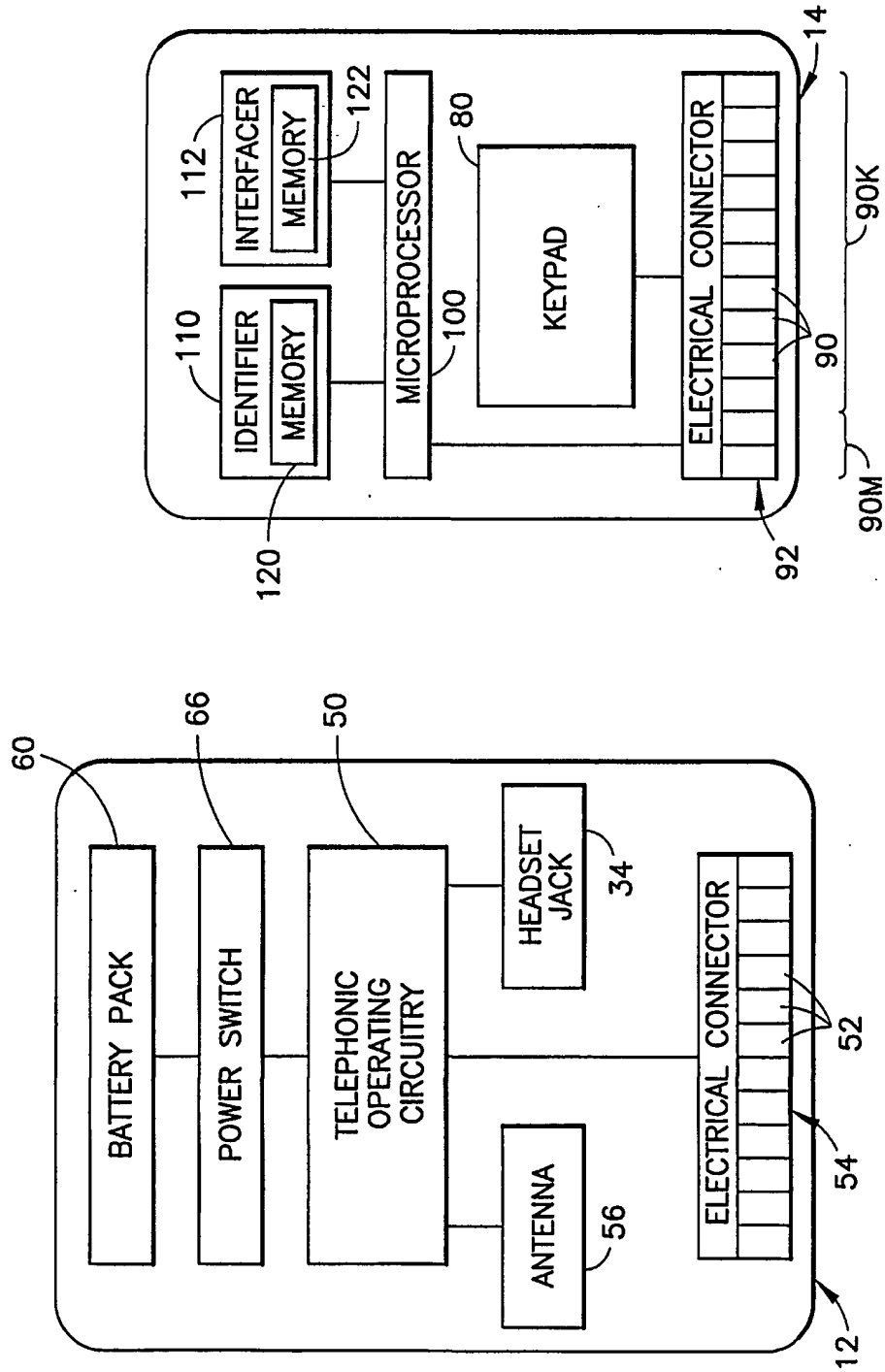


FIG. 5

FIG. 4

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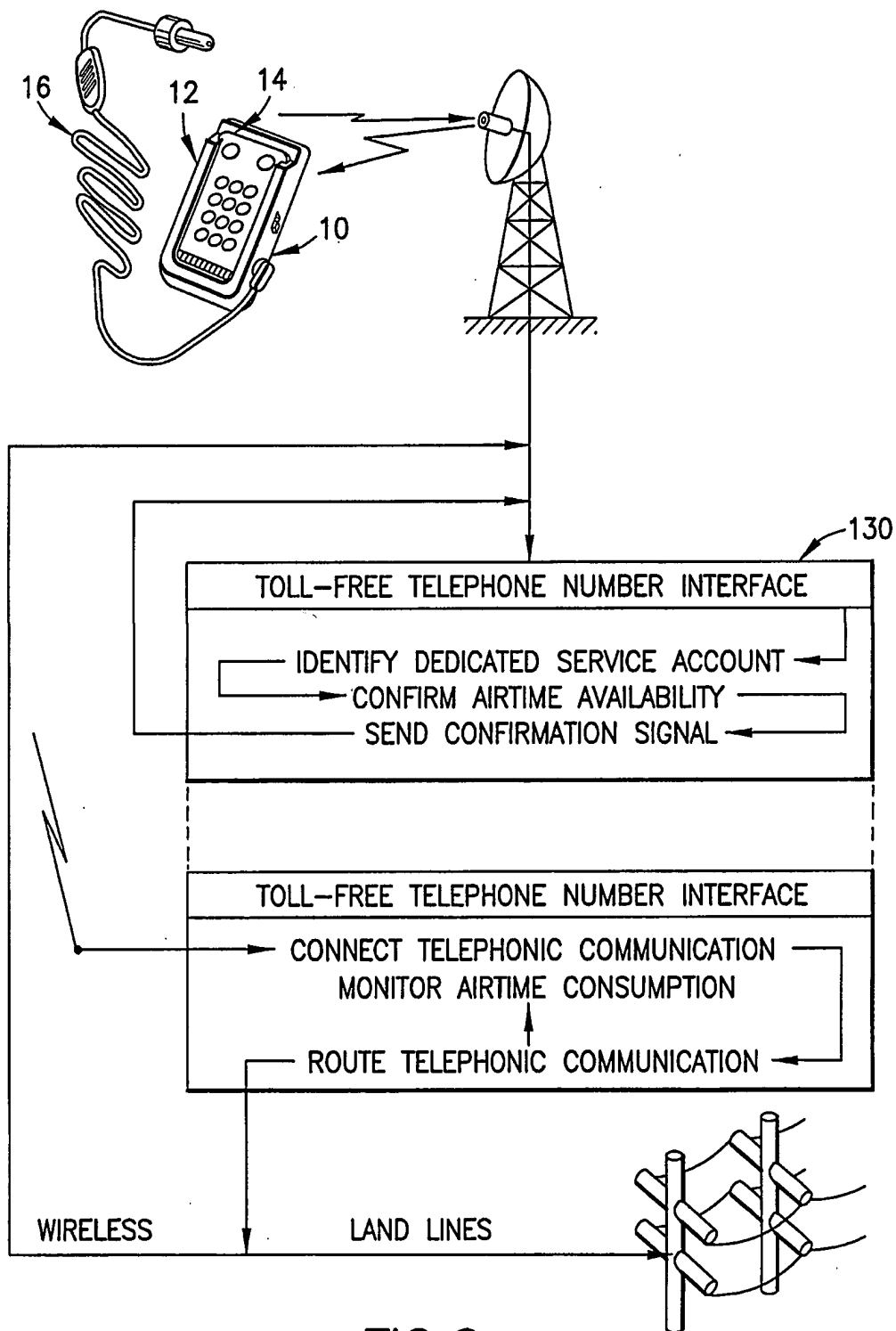


FIG.6

## INTERNATIONAL SEARCH REPORT

International application No.  
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<b>A. CLASSIFICATION OF SUBJECT MATTER</b>																				
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US CL : 455/90, 558, 568, 569, 575																				
According to International Patent Classification (IPC) or to both national classification and IPC																				
<b>B. FIELDS SEARCHED</b>																				
Minimum documentation searched (classification system followed by classification symbols)																				
U.S. : 455/90, 550, 558, 568, 569, 572, 575; 379/428.01, 428.02, 428.04, 428, 430, 431, 433.01, 433.03, 433.05, 433.09, 434																				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched																				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)																				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>																				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																		
A	US 5,875,393 A (ALTSCHUL et al) 23 February 1999, see entire reference.	1-12																		
A	US 5,965,848 A (ALTSCHUL et al) 12 October 1999, see entire document.	1-12																		
A	US 6,061,580 A (ALTSCHUL et al) 09 May 2000, see entire document.	1-12																		
A,P	US 6,212,414 B1 (ALAMEH et al) 03 April 2001, see entire document.	1-12																		
A,E	US 6,351,629 B1 (ALTSCHUL et al) 26 February 2002, see entire document.	1-12																		
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.																				
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